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*Agricultural
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Cover Crop Research

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Sustainable Agricultural Systems Lab

Cover Crop Management

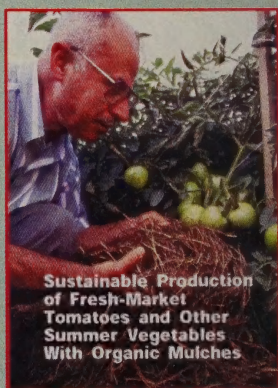
Cover crop management systems have been developed for several climates in the U. S.:

- Winter annual cover crops for temperate summer vegetable crops,
- Summer annual cover crops for temperate fall vegetable crops,
- Summer tropical cover crops for subtropical winter vegetable crops,
- Summer tropical cover crops for desert orchards.



USDA Farmers Bulletin 2279

The development of a sustainable system for no-tillage production of fresh-market tomatoes with a hairy vetch cover crop has been a hallmark accomplishment. Over 49,000 copies of USDA Farmers Bulletin 2279 have been requested in the past decade.

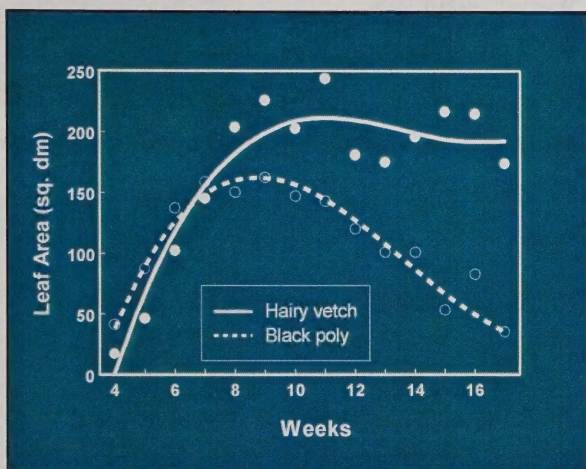


Sustainable Production of Fresh-Market Tomatoes and Other Summer Vegetables With Organic Mulches

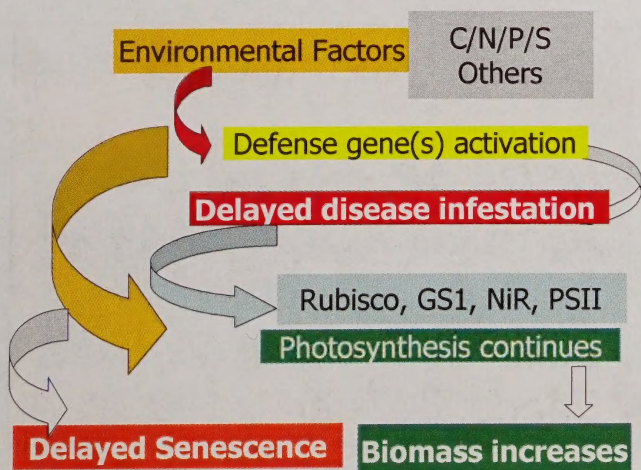
USDA United States Department of Agriculture Agricultural Research Service Farmers Bulletin No. 2279 Revised August 1997

Characteristics of Hairy Vetch-Tomato System

Tomatoes are transplanted without tillage into a mowed hairy vetch cover crop. Reduced inputs of fertilizers, herbicides, and fungicides are used for producing fresh-market tomatoes.



Tomatoes grown in a hairy vetch cover crop produce higher leaf area, marketable yield, and net returns than those grown with a standard black polyethylene mulch. A suite of genes that are interlinked with delayed senescence and enhanced disease resistance are activated in vetch grown tomatoes.



Ecosystem Services and Environmental Protection

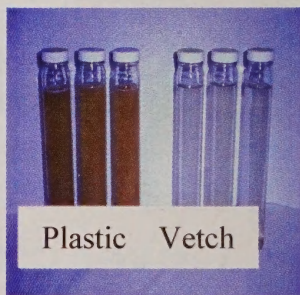
- Improves soil physical structure,

- Enhances rainfall infiltration,

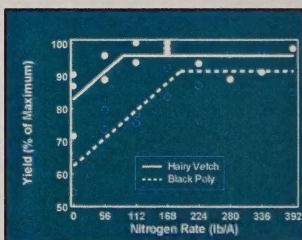
- Reduces evaporation,

- Reduces water runoff,

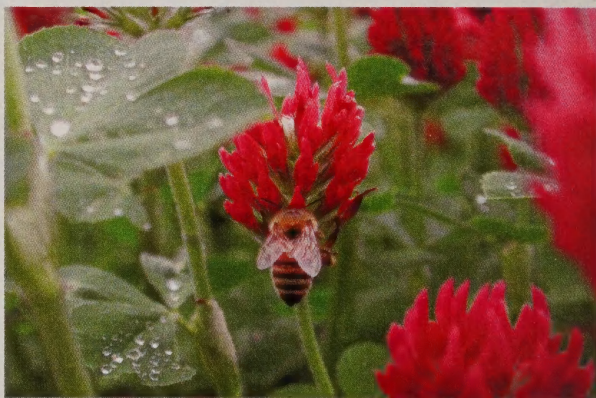
- Reduces sediment, nutrient, and pesticide losses in runoff by 75 to 95%,



- Increases nitrogen contribution by legume cover crops to nitrogen-requiring crops,



- Attracts beneficial insects,



- Facilitates suppression of
Weeds – small-seeded annuals
Diseases – foliar
Pests – Colorado potato beetle.

What are cover crops?

Cover crops are plants grown during the off-season when cash crops are not being produced. Research in the Sustainable Agricultural Systems Lab has identified optimum cover crop management systems for cash crop production and has determined many ecological services provided by cover crops.

Cover crop species under study

Hairy vetch



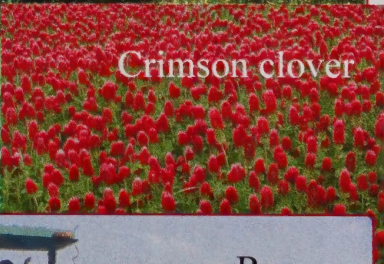
Sunn hemp



Velvetbean



Crimson clover



Rye



Forage radish



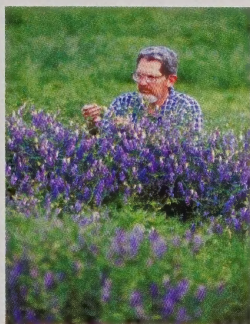


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On-Going Research

- Breeding improved cultivars of hairy vetch with early flowering and winterhardiness.

Tom Devine,
devinet@ba.ars.usda.gov



- Determining molecular mechanisms for crop response to cover crops.

Autar Mattoo, mattoo@ba.ars.usda.gov

- Understanding rhizosphere and soil microbial populations associated with cover cropping.

Jeff Buyer, buyerj@ba.ars.usda.gov

Dan Roberts, robertsd@ba.ars.usda.gov

- Enhancing weed and pest suppression with cover crops.

John Teasdale, teasdale@ba.ars.usda.gov

Don Weber, weberd@ba.ars.usda.gov

- Determining the behavior of allelopathic compounds in soil.

Cliff Rice, ricec@ba.ars.usda.gov

Contact Information:

***USDA-ARS Sustainable
Agricultural Systems Lab***

Building 001 Room 245

Beltsville, Maryland 20705

Phone: 301-504-7199

